

1 **STIMULATING DEVICE FOR STIMULATING**
2 **MUSCLE AND VITAL POINTS OF A HUMAN BODY**

3 BACKGROUND OF THE INVENTION

4 1. Field of the Invention

5 The present invention relates to an insole stimulating device that includes the
6 electrical stimulating device, magnetic unit and thermal unit to perturb intercellular
7 fluid, to excite the cellular permeability and to increase ion flow of stimulated muscle as
8 well as the vital points of the human body. Our current invention is to apply large area
9 electrodes to areas of body that also contain well defined vital points, so that, with a
10 carefully controlled electronic stimulation, it can effect a remote treatment of body parts
11 or functions through the combination of local muscular stimulations and peripheral
12 nervous stimulation .Moreover, the stimulating device having a pair of electrical plate to
13 provide electrical field that agitates ion flow, the magnetic unit to provide field that
14 enhances intercellular ion flow and thermal unit to provide the thermal effect to the local
15 area to improve status of circulation. Also, said the stimulating device that is able to
16 enhance Chi and intercellular fluid circulation at the local area that will alleviate edema
17 at lower limb and will speedup the healing process for low back pain.

18 The electrical plates fixed on the insole are placed against the skin of the human
19 body and aligned with the vital points or area of pressure point, K1 and foot heel area
20 (FHA, a newly found singular vital point) of the human body. A controlled electric
21 stimulating circuit is connected to the electrical plates to provide oscillation pulses
22 string or a continuous modulating AC signal to the electrical plates. So that the
23 oscillation pulses string from the electrical plates is able to stimulate the local area of
24 target muscle group as well as the vital points. This invention is much effective than an

1 example of others treatments that are indicated in the treatment of the lower back pain.
2 A local electronic massaging of the waist can be effective in the temporary relief of the
3 lower back pain, but the pain relief is usually temporary and not sustainable and returns
4 soon after the treatment ends.

5 While there are many causes for the lower back pain, a good portion of such a pain
6 is the result of progressive deterioration of muscle and nerve systems from the feet up to
7 the waist. The traditional practice of acupuncture sometimes also is accompanied by the
8 application of heat to the acupuncture points. Such heat may enhance the effectiveness
9 of the needle punctuation. No known electronic stimulation systems integrate the ability
10 to apply heat to the point of stimulation, even though there are many stand alone heat
11 applying systems, such as heating pads, for such symptoms of muscle pain, back pain,
12 etc.

13 When we invent the insole stimulation system using large-area electrodes on two
14 locations on the foot containing the vital K1 and FHA acupuncture points, the effect of
15 the treatment has been demonstrated to greatly exceed that of each method administered
16 separately. It is also commonly known that stimulation vital acupuncture points, K1 and
17 FHA, on each foot, with needles or electronic stimulation, can provide great relief in the
18 lower back pain. We use sophisticated electronic technologies to effect electronic,
19 thermal and magnetic stimulations. It is further noticed that, the thermal stimulation is
20 not applied directly to the lower back. Instead it is applied to the areas where electronic
21 stimulation is applied to, the same area where vital acupuncture points lie. This is
22 because electrical stimulation will dramatically enhance intercellular permeability and
23 increase ion flow of stimulated muscle which improves lower body circulation that will
24 relieve lower back pain.

1 The magnetic units are customarized in the fixing element on the insole that is
2 corresponding to the electrical plates to facilitate the increase of intercellular ion flow at
3 the local area of the human body.

4 A thermal element, such as a heating device, is customary in the fixing element on
5 the insole that is connected to a thermal control unit to provide thermal effect to the local
6 body area at skin to improve the status of circulation. A thermal control unit is connected
7 to the power source that provides the temperature control to the heat element. So that the
8 thermal effect from the heat unit warms the surrounding muscular tissues of the skin to
9 facilitate the increase of the blood circulation of the local area.

10 2. Description of Related Art

11 Electronic Stimulation has been applied to muscle groups for temporary relief of
12 pain, physical training or rehabilitation. It has also been applied to peripheral nerve
13 system for temporary relief of pain. These applications have generally been applied to
14 the body where actual pain was experienced. The areas of the electrodes used in these
15 applications tend to be rather large in order to provide a broad range of stimulation to a
16 group of muscle or nerves. Therefore, the prior art of electronic stimulation has
17 consisted two distinctly different schools of applications: (1) electronic stimulation
18 using large sized electrodes spaced from each other to effect a significant local
19 muscular and nervous stimulation; and, (2) electronic stimulation using small electrodes
20 spaced very close to each other to effect precise vital point nervous stimulation to effect
21 treatment or pain relief of remote body parts or functions.

22 Acupuncture has been a traditional remedy for Chinese who may suffer aches and
23 pains etc. The acupuncturist applied needles that extend into vital points of a patient so

1 as to help the patient to enhance the ‘Chi’ and circulation of blood. The vital points are
2 over the body and also known as the pressure points. Each of the vital points is the
3 junction of Chi and blood. Therefore, every vital point dominates a primary task
4 concerning the health of the human.

5 The primary purpose of acupuncture is to stimulate the vital points by needles such
6 that the channels for ‘Chi’ are cleared. In spite of the acknowledged effect of
7 acupuncture, the only problem is that an appointment needs to be made first with the
8 acupuncturist. That is, the patient’s day somehow has to be rescheduled to match the
9 acupuncturist’s availability. To overcome the shortcoming, an easy way of achieving the
10 similar effect is to use the magnetic units. The magnetic units, energy stone, are placed
11 on top of some specific vital points. The energy stone constitutes an energy field around
12 the vital point so as to facilitate the blood circulation, which effectively relieves the
13 patient’s suffering.

14 Recent electronic stimulation application also include applying the stimulation to
15 particular “ acupuncture” points (or vital points) to simulate the effect of needles used
16 in the acupuncture for the relief of pain or treatment of a wide variety of diseases. In
17 such an application, the points of stimulation may be different from the target of the
18 treatment. An example of such an application is in US patent 4981146, entitled “ Nausea
19 control Device”, where a closed spaced electrodes carrying pre-determined level of
20 electronic stimulation is applied to the vital point per-cardium six acupuncture point,
21 generally called P6 point in acupuncture, under the wrist, to effect the suppression of
22 motion sickness, morning sickness, vomiting, etc.

23 Another Chinese remedy is massage. Using appropriate force that applies to
24 muscles or some specific vital points is able to relieve the patient’s pain, fatigue and

1 many other disorders. However, since massaging is very tiring for the masseur, an
2 electronic massager is developed to the market. With the electronic massager, the user is
3 able to relax whenever is suitable.

4 However, to have both effects from the electronic massager and the energy stone
5 seems impossible unless there is a way to integrate the space, signal and the circuitry of
6 the electronic massager and the energy stone.

7 To overcome the shortcomings, the present invention tends to provide an improved
8 stimulating device to mitigate and obviate the aforementioned problems.

9 SUMMARY OF THE INVENTION

10 The primary objective of the present invention is to provide an improved
11 stimulating device to enhance the intercellular ions circulation. The present invented
12 device includes the electrical plates provide stimulus to the vital points as well as the
13 muscles. A heating element provides thermal effect to the area, where the heat element is
14 applied to improve the status of local circulation. A magnetic unit aligned with the
15 electrical plates to that the magnetic field from the magnetic units is able to facilitate the
16 increase of intercellular ion circulation of a human to whom is wearing the stimulating
17 device of the present invention.

18 Another objective of the present invention is to provide an improved control circuit
19 to not only provide electricity to the electrical plates, but also regulate the effect of the
20 resistance of the stimulating device of the present invention so that the patient is able to
21 adjust the control circuit according to individual physical conditions.

22 Other objectives, advantages and novel features of the invention will become more

1 apparent from the following detailed description when taken in conjunction with the
2 accompanying drawings.

3 BRIEF DESCRIPTION OF THE DRAWINGS

4 Fig. 1 is a perspective view showing an insole, a preferred embodiment of the
5 stimulating device being received in a shoe;

6 Fig. 2 is an exploded perspective view of the stimulating device and an embodiment
7 of the fixing element in the shoe in Fig. 1;

8 Fig. 3 is a schematic view in partial section showing the relative positions between
9 the stimulating device and the fixing element;

10 Fig. 4 is a block diagram of the control circuit of the present invention;

11 Figs. 5A and 5B are schematic views showing the output wave patterns after being
12 converted from low frequency signal;

13 Fig. 6 is a schematic view showing the application of the stimulating device of the
14 present invention; and

15 Figs. 7, 8 and 9 are schematic views showing the stimulating device is applied to
16 different parts of a patient.

17 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

18 With reference to Figs. 1 and 2, the stimulating device in accordance with the
19 present invention includes a fixing element (10), at least one pair of electrical plates
20 (11,12), a heat element (13), at least one magnetic stone (14,15) and a control circuit
21 (not shown).

1 With reference to Fig. 2 again that the fixing element (10) in this embodiment
2 includes a pad (101) and an insole (102) securely connected to the pad (10). The pad (10)
3 has holes (103) corresponding to the magnetic units (14,15) such that the magnetic units
4 (14,15) are able to be received in the holes (103). The resistance (13) is substantially
5 located along a contour of the insole (102). The electrical plates (11,12) are respectively
6 then securely applied on top of the magnetic units (14,15). Bolts (not numbered) are
7 used to firmly engage the pad (10) to the insole (102). It is to be noted that the electrical
8 plates (11,12) may have one positive plate and one negative plate. Other embodiments
9 show that the combination of the electrical plates (11,12) may have one positive plate
10 and the others are negative plates or vice versa.

11 With reference to Fig. 3, after the assembly of the stimulating device of the present
12 invention, the electrical plates (11,12) (only the electrical plate (11) is shown)
13 correspond to the magnetic units (14,15) (only the energy stone (14) is shown).

14 With reference to Fig. 4, the control circuit of the present invention includes a
15 signal generating unit (20), a power amplifying/boosting circuit (30), a temperature
16 control circuit (40) and a power source (50).

17 The signal generating unit (20) generates a mediate or a low frequency signal and
18 sends the generated signal to the electrical plates (11,12) so as to stimulate the muscle
19 and vital points around the electrical plates (11,12). The signal generating unit (20)
20 includes a mediate frequency oscillator (21), a low frequency conversion circuit (22)
21 and a magnitude control circuit (23). The mediate frequency oscillator (21) is to
22 generate a mediate frequency signal which is then converted to a low frequency signal
23 by the low frequency conversion circuit (22). The magnitude control circuit (23) aims to

1 control the strength of the converted low frequency signal.

2 With reference to Figs. 5A and 5B, the drawings show two different kinds of
3 working waves for the magnitude control circuit (23) by the low frequency conversion
4 unit (22).

5 The power amplifying/boosting circuit (30) connecting to the output of the signal
6 generating unit (20) includes a power amplifying circuit (31) and a voltage booster (32).
7 The signal sent by the signal generating unit (20) is processed respectively by the power
8 amplifying circuit (31) and the voltage booster (32) and sent to the electrical plates
9 (11,12).

10 The temperature control circuit (40) includes an output connecting to the resistance
11 (13) for controlling the temperature of the fixing element (10).

12 The power source (50) is composed of a filter (51) and a transformer (52). The
13 transformer (52) provides electricity to the resistance (13) via the temperature control
14 circuit (40) and rectifies the current from the filter (51).

15 Therefore, from the foregoing description, the preferred embodiment of the present
16 invention shows that the fixing element (10) is composed of a pad (shoe pad) and an
17 insole (102) such that the user is able to place the fixing element (10) inside the shoe
18 with the heat element (13) substantially surrounding the contour of the insole (102) and
19 the electrical plates (11,12) and the magnetic units (14,15) received in the pad (101).
20 With the foregoing arrangement, the user is able to simultaneously stimulate and
21 provide mild thermal effect to the vital points.

22 With reference to Fig. 6, the fixing element (60) may be formed by elastic cloth to

1 be worn on a finger. The positive electrical plate (11) and the negative electrical plate
2 (12) respectively have a corresponding magnetic stone (14,15) which corresponds to
3 various vital points on the finger. Thus, the user is able to stimulate the muscle and
4 stimulate the surrounding tissues surrounding the specific vital points by the electrical
5 plates (11,12) and the energy stones (14,15).

6 With reference to Figs. 7 and 8, the fixing element (70,80) also may be made of an
7 elastic cloth so that the user is able to wear the fixing element (70,80) on the leg or on the
8 arm to respectively stimulate and warm the specific vital points.

9 With reference to Fig. 9, the fixing element (90) may be a cap. Because the vital
10 points in the head are more complex than other portions of the body, the arrangement of
11 the electrical plates (11,12) may be one positive plate and one negative plate, one
12 positive plate and others negative plates or one negative plate and others positive plates.

13 Therefore, with the temperature provided by the resistance (13), the specific portion
14 of the patient's body is treated for swelling and the like. Also the electrical plates (11,12)
15 provide a massaging effect to the vital points and surrounding muscles with the
16 assistance of the power amplifying circuit (31) and the voltage booster (32). The effect
17 by the resistance (13) is much the same as the "warm-up" before starting a sport, which
18 is able to increase the blood circulation, the flexibility of the body and metabolism of the
19 body.

20 It is to be understood, however, that even though numerous characteristics and
21 advantages of the present invention have been set forth in the foregoing description,
22 together with details of the structure and function of the invention, the disclosure is
23 illustrative only, and changes may be made in detail, especially in matters of shape, size,

- 1 and arrangement of parts within the principles of the invention to the full extent
- 2 indicated by the broad general meaning of the terms in which the appended claims are
- 3 expressed.